Blended memory: A framework for understanding distributed autobiographical remembering with photography

Title Page

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Abstract

This paper offers a framework for understanding how different kinds of memory work together in interaction with people, photographs and other resources. Drawing on evidence from two qualitative studies of photography and memory, as well as literature from cognitive psychology, distributed cognition and media studies, I highlight complexities that have seldom been taken into account in cognitive psychology research. I then develop a "blended memory" framework in which memory and photography can be interdependent, blending together as part of a wider activity of distributed remembering that is structured by interaction and phenomenology. In contrast to studies of cued recall, which commonly feature isolated categories or single instances of recall, this framework takes account of people's histories of photographic practices and beliefs to explain the long-term convergence of episodic, semantic and inferential memory. Finally, I discuss implications for understanding and designing future memory research.

Keywords

Distributed cognition, photography, memory, episodic, semantic, inference.

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Introduction

Despite a long tradition of using photographs to support remembering, our psychological understanding of this relationship is somewhat superficial. The focus of research has been mostly on the effects of using photographs as cues for recall. Examples include Koutstaal et al.'s (1998) study showing that reviewing photographs and written descriptions can improve older adults' recall of recent events; Strange et al.'s (2005) study showing that doctored photographs can produce false memories; and Loveday and Conway's (2011) study comparing the potential of diary entries and photos taken by a SenseCam (an automatic, wearable camera) to aid remembering of previously forgotten experiences. Yet engagement with photography extends beyond *viewing* (looking at photos). It also involves *capturing* (taking photos), *organising* (sorting into albums, editing, annotating, etc.), and *sharing* (showing, talking about or sending photos to other people). It is encouraging, then, that psychologists have recently begun to study capturing practices. Henkel (2014) showed that taking photographs can impair subsequent memory for visual details of photographed objects and, in a follow-up study, Soares and Storm (2018) demonstrated this effect regardless of whether participants expected to have access to the photographs in the future.

By examining single practices in isolation, each of the studies cited so far neglected potentially important dynamics between practices. Indeed, viewing often happens as part of sharing and organising (Van House et al., 2005), while many personal photographs are rarely viewed at all, remaining forgotten on cameras or hard drives (Whittaker et al., 2010). Further, the controlled situations typically used in psychological studies of photography do not reflect the diverse contexts and idiosyncratic practices discussed in human computer interaction and media studies (e.g. Chalfen, 1984; Keightley and Pickering, 2014; Slater, 1995; Van House et al., 2005; Whittaker et al., 2010).

Psychological understandings of memory can be enhanced by interaction with different disciplines and research methods. Work in distributed cognition has helped us to understand how social and material interactions can constitute intimate elements of cognitive processes of remembering (Sutton 2010). Media studies research has shown how photographic practices are strongly influenced by technological and cultural context (Van House et al., 2005), and that memorial functions of photography overlap with communication, creativity and identity construction (Sarvas and Frohlich, 2011). Pickering and Keightley (2015) analysed over 100 interviews and several focus groups, finding that, through the use of media, their participants' everyday memory was neither entirely individual, nor entirely collective, and was contingent on their material and social interactions.

In this paper, I discuss insights from two interview-based studies of photography and memory in relation to literature from cognitive psychology, distributed cognition and media studies. This is followed by the presentation of a framework of blended memory,

in which I argue that everyday autobiographical memory involves a coalescence of different kinds of remembering, realised through social and material practices. The importance of the phenomenology of individuals engaged in distributed remembering is then discussed in relation to the long-term development of photographic practices and beliefs about memory. Finally, I propose some implications of this view for considering the role of photography in structuring future remembering and for understanding and designing memory research.

Investigating photography practices and memory

In Study 1, I interviewed six women, aged 30-45, a year-and-a-half after they had attended a civil partnership wedding in Scotland. In Study 2, I interviewed 15 University staff about photography and remembering across their lifetimes, exploring their changing technologies and approaches. In each study, participants selected photographs as stimuli for talking about how they had used photography to remember. Interviews for Studies 1 and 2 and took place in 2012 and 2015, respectively. In this paper, Study 1 participants are given initials as pseudonyms (e.g. AE, JI, IO), while Study 2 participants are given first names (e.g. Lorraine, Robert, Ingrid). Details of the background, methodology and results of these studies are described in depth in Fawns (2017).

Given that memory is reconstructive (Michaelian, 2011a) and prone to various distortions and simplifications (Conway, 2005; Kahneman, 2011), it is reasonable to question the accuracy of my participants' accounts, and their understandings of their own remembering processes as these relate to photographic practices. However, as Brown and Reavey (2015: 137) proposed, remembering is a social process that is not just about "producing an account of the past event but also establishing its contemporary relevance." The focus of the present paper is not on accurately characterising actual, past photographic practices, but on understanding how engagement with photographs through social and material practices contributes to remembering the past. Further, the framework of blended memory presented later in the paper is not derived from psychological processes as described by participants. Instead, my participants' accounts served to contextualise their practices, indicate their beliefs about memory and technology, and provide insights into their understandings of how photography could enhance or impede remembering. However, I acknowledge that the ideas presented here will benefit from interrogation through other methods. I believe this to be the case with all methods, as limitations in each approach can be balanced by the advantages of others.

Inference and the Episodic / Semantic Divide

The distinction between episodic and semantic memory, originally proposed by Tulving (1972), has contributed enormously to our psychological understanding of memory impairment (Murphy et al., 2008), decision-making (Klein et al., 2002), social functioning (Alea and Bluck, 2003; Newman and Lindsay, 2009), and much more. Episodic memory is concerned with subjective experience and a sense of "reliving" the past, whereas semantic memory pertains to generalised knowledge about the world. Information about one's personal past can be recalled using semantic memory, but this contains only the details of what happened, not the subjective, personal connection to those details (Conway, 2005; Wheeler et al., 1997). A common method of determining

which category an instance of recall belongs to is Tulving's (1985) remember / know paradigm, where research participants indicate whether they "remember" (episodic) or "know" (semantic) some aspect of the past. The episodic / semantic distinction has been explored in depth, across a wide range of situations and through many different methods, but often without taking into account the cultures, context and practices that influence remembering.[1] Consider Jane's description of using photographs in remembering a life event.

> Jane: The photograph becomes the focal point of the memory system that everything then extends out from, so, you look at that one particular photograph and think, 'Okay, where was that, when was it, what else happened round about?' and then you just build and build and build and it gets wider and wider.

Despite recent work recognising the integration of episodic and sematic memory (e.g. Renoult et al., 2012 on "personal semantics", and Irish and Piguet, 2013 on the role of semantic information in episodic remembering and episodic future thinking), the relationship between these categories remains under-theorised. In the example above, Jane did not just look at a photograph and episodically or semantically recall parts of an experience. She described a "memory system" that combined perception, recall, inference and photographic information through a procedural and, potentially, skilled performance. As well as facilitating the integration of different elements to construct memory that was broader than a single event, inference supported the interpretation of what might have happened. In the following example from Study 1, PJ pondered which folk dance was represented in a photograph.

> PJ: I think they were maybe doing Strip the Willow, eh — The Dashing White Sergeant or something — just looking at the formation of the three of them there makes me think of that.

This example does not fit with Tulving's (1985) remember / know distinction. PJ did not know which dance the people in the photograph were doing, nor did she recall it. Instead, she inferred possibilities from the formation of the dancers, coupled with her knowledge of the kinds of dances that happened on the night.

Some scholars have explicitly or implicitly suggested that inference does not count as remembering. For example, Wells et al. (2014) distinguished inference from "real" memory (i.e. recall) in their exploration of early childhood memories. Finding that adults' accounts of their earliest memories were implausibly detailed compared to those of children, they suggested that additional detail was added over time, often through reference to external sources, such as people or photographs. They proposed that adults come to have complex memories of early childhood events through "nonconscious and conscious inferences" that function as "contextual scaffolding" for the construction of memory (Wells et al., 2014: 1258). Thus, the output of remembering combines inferred and "remembered" information in which inferences enable remembrances and vice versa. Wells and colleagues' implied position that inferred details are not "really" remembered is problematised by their acknowledgement that all memory contains inferences and that all memory is augmented via constructive processes.

Similarly, Conway and Loveday (2015) differentiated inferred from remembered details and interpreted the pervasive presence of inference to mean that "all memories are to some degree false" (p. 580). Yet inference should be seen not simply as a distortive influence that produces falseness, but as part of the adaptive, constructive function of memory.[2] Returning to Wells' et al. (2014) study, adults augmented or developed childhood memories by inferring details that were likely to have been present but that could not have been understood by the child at the time of the original experience. It is possible, therefore, that inference can enhance, rather than only impair, accuracy (Michaelian, 2011a).

In my studies, inference was a critical component of remembering, as participants combined what could be seen in photographs with what was known to deduce plausible explanations of what was likely to have happened. The process of deduction could be immediate, or it could be slow and complex, suggesting parallels with direct and generative retrieval, respectively (Conway and Pleydell-Pearce, 2000; Harris, et al., 2015). Indeed, inference could be deductive and generative: new information could be added during memory "retrieval" (Michaelian, 2011a), such as when my participants in Study 1 had learned about previously unseen aspects of the wedding by looking at and interpreting other people's photographs.

In contrast to effortless, direct retrieval, Harris and colleagues (2015: 205) pointed out that "in generative retrieval, when encountering a memory cue, one has to bring to mind additional, related information and knowledge from one's life before a specific memory is recalled". However, for my participants, resources were not necessarily brought together in the search for "a specific memory". In Jane's example, information was gathered until she could produce a satisfactory account of the past, whatever that turned out to be. She described how the wintry appearance of one photograph, combined with Christmas decorations and guests, allowed her to narrow the photographed scene down to a particular kind of occasion.

> Jane: I'm looking at these, I can't quite remember when that was but I'm seeing it's winter, it's Christmas time, my friends were up visiting.

From this, she was able to recall further, related information and compare the times at which different events happened.

> Jane: What else happened that year, you know, gosh they weren't married at that point, they only just got engaged, their dog was here, [my son] liked the dogs but the cats didn't…

Jane mixed recalled details, including event-specific and contextual information, with predictions about things she would have done. Not all available evidence was contained within photographs; it could also be produced through association.

> Jane: And then just thinking about all the other things I would have done around that time. I mean, it's Christmas time so, I've gone home for Christmas and where did I spend Hogmanay and what other events, cos [my son] and I tend to do one thing each year, you know, a kind of Christmas event. What was it I did that particular year?

The photograph was a starting point for associations with winter, Christmas, social events and relationships and, gradually, specific details that supported a sense of remembering

that extended beyond a particular event. Inference and recall bound together into a larger, richer memory, contrasting with models of remembering in which a single act of recall is classed as a particular memory type.

Distributed remembering and photography

Despite some important moves towards an ecological perspective (e.g. Cohen and Conway, 2008; Neisser, 1978), much cognitive psychology literature still lacks a thorough appreciation of current and historical, social and material interaction. Distributed cognition, drawing from psychology and philosophy, explains how processes of thinking can be shared across systems that include people, technologies, media and environments (Clark and Chalmers, 1998; Hutchins, 1995; Sutton, 2010). From this perspective, cognitive properties of the remembering system are not attributable to individual components (Hutchins, 1995). Distributed remembering, then, is not simply affected by interaction with external resources, it is constituted by such interaction (e.g. Sutton, 2010).

Such views have been criticised as attributing cognitive capacities to inanimate objects and as unnecessary for explaining cognition (Adams and Aizawa, 2010), or as overly inclusive (Rupert, 2004). Compelling responses to these criticisms have already been presented by others (e.g. Clark, 2013; Sutton et al., 2010). Rather than repeat those arguments here, I prefer to focus on the methodological value of thinking of remembering as distributed (Michaelian and Sutton, 2013): it helps us understand what is important and how we might better study it. What counts as cognition is less relevant than what can be seen by changing our definition of what counts.

A distributed perspective can help us to understand cueing as more than the coming together of present information and stored traces of past experience (Tulving, 1983). For my participants, engagement with photographs could bring into awareness the existence of past experience or previously known information. It could facilitate mental time travel (Michaelian, 2016), where imagery, sensory information, and emotion from the past seemed to become present. It could trigger associations between photographs and related stories, general concepts, or the "gist" of an event, time period, or relationship (see Conway, 2009). Often, photographs were used in deductive, inferential processes to work out what must have happened, to confirm details, or to learn things about people or events. Each of these processes could facilitate further remembering. Jane's description, above, of the photograph as "the focal point of the memory system" upon which she could "build and build and build," conveys this idea of memory as constructed through a progressive layering of interactions. However, it is in the long-term structuring and configuring of memory that the distributed nature of remembering becomes clearest.

Structuring memory

By producing potential cues and, in parallel, through the experiences of producing and engaging with those cues, photography practices supported a sense of continuity across time—from the present "experiencing self" to a future "remembering self", and from a present remembering self, back to a previous experiencing self (Kahneman and Riis, 2005). Considering these "selves" can illuminate different perspectives from which we

prospectively and retrospectively structure remembering. For Kahneman (2011), the remembering self selectively generates the story of what happened to the experiencing self in the past. However, as Albright (1994) pointed out, the experiencing self also provides foundations and constraints for future remembering.

Taking or organising photographs could be seen as attempts to increase the likelihood that particular experiences would be remembered, and, thus, photographs were not just aids to recall but could help participants to *remember to remember*. In Study 1, PJ conveyed the sense of responsibility of selecting photographs for a wedding album, potentially structuring not only her own remembering but that of other people.

> PJ: You do think well, this is going to be important potentially in the future and you want to make the right choices.

Displaying photographs, for example, increased the likelihood that people would see them and, therefore, look back at the past. Yet privileging the content of photographs within memory might produce a *levelling and sharpening* effect, as neglected details fade into the background while others become emphasised through rehearsal (see Koriat et al.'s [2000] description of the Gestalt principles of memory distortion). Thus, alongside the possibility that taking photographs impairs memory for what is captured (Henkel, 2014), looking at photographs might impair memory for what is not captured. To some extent, this principle was implicated in purposeful attempts at distributed forgetting, where participants disposed of photographs, choose not to take a photograph, or chose not to have their photo taken. Of course, an absence of photographs did not make memory of the event unavailable or inaccessible (Michaelian, 2011b), but reduced the probability of exposure to relevant cues.

It was also not uncommon for participants to use photography to portray a different reality through framing, composing, posing, etc. An extreme example was presented by Kate in Study 2 (Figure 1 below).

Figure 1. Photograph of a cat covered in streamers, next to wine glasses

The image appears to show a cat, sitting on a table, during a celebration. Kate told a very different story.

> Kate: It evokes quite a lot of negative memories, which is I think interesting because there's nothing overtly negative about the photo… I tried to make it look like we had some sort of a party there… but it was a very sad time actually. It was a very lonely time and whatever party is perceived there, didn't actually happen.

The image had to be reconciled with other remembered information and source monitoring processes (Jacoby et al., 1989), and Kate associated this photograph of a staged event with her memory of the real experience. It became one of a number of photographs that Kate actively avoided looking at.

While in Study 1 there had been very little engagement with wedding photos prior to the interviews, in Study 2, years of capturing, sharing and organising practices had established rich histories of engagement with selected photographs. This was exemplified by Lorraine's picture of her father and his dog, taken for a newspaper when she was a young girl. For years, Lorraine travelled the world, carrying a print of it in her pocket.

Later, this fading document was scanned and digitally restored by her brother-in-law and became part of a collection displayed in a large digital photo frame on Lorraine's wall, inspiring numerous conversations with visitors. Figure 2 shows the photo displayed via the digital frame on Lorraine's wall, conveying a sense of the changing materiality of the image. It would have been impossible to predict this trajectory, in part because some of the technology did not exist at the time it was taken. The evolving materiality, social interactions and technological possibilities all contributed to a complex and emotion-laden engagement with the image.

Figure 2. Lorraine's dad and his dog displayed as a digital photograph in the DigiFrame

Pictures of previous generations could also be viewed in a detached manner, as historical rather than personal. For example, Robert's pictures of his grandfather as a young man were originally taken as holiday photographs but had become "historical" documents.

> Robert: I only remember him as a very old man, but that's kind of — what do you call it, history, rather than remembrance.

It may be that, for Robert, "remembrance" required memory of lived experience. Yet Nick was able, through an archive constructed by his father, to visualise how his ancestors had lived and, thereafter, to remember his impression of their lives. Photographs seemed to provide access to a previous context, facilitating the construction of memory for events that had not been witnessed first-hand (another concept under-represented in cognitive psychology[3]). However, they were also understood in relation to the viewer's current context, and this could be exploited to help participants understand themselves and their pasts. A series of photographs helped Nick make sense of his daughter's recovery from illness and reflect on what his family had been through. He used his photograph collection to think about his family's progress over time.

> Nick: I see photos as a journey, because life is a journey in general… the photos help us take a log of that journey, so we know where we've been.

Thus, beyond supporting recall, participants could use photography as part of an active configuration of their understanding of the past. Of course, participants did not always intentionally use photography practices to structure memory in the ways described above. They could not easily predict where and when they would take photos, often deciding in the moment. It was also difficult to predict the future importance of photos or even events. Participants had often photographed scenes because, at the time, the experience felt important enough to be remembered in the future. Later, they valued these experiences differently, presumably because the temporal distance from the original experience had changed their perspective (D'Argembeau and Van der Linden, 2004) and because the remembering self is necessarily selective (Kahneman and Riis, 2005). On the other hand, spontaneous activity could produce unexpectedly valuable photographs. Mundane objects prompted reflection on earlier periods, and everyday photographs of relatives became emotionally powerful after they had passed away. The unpredictability of what makes an effective cue (Van den Hoven, 2014) may have contributed to participants generating so many cues. Across both studies, far more photos had been taken than could later be appreciated; as IO said, "Who knows what turns out to be the photo you look back at and go 'oh, yeah, that was the key'?"

Many participants aspired to be more organised and consistent in their approach to photography. They talked of failed intentions and plans that had not been followed, mirroring Whittaker et al.'s (2010) participants, whose photograph archives were rarely constructed or used as intended. Although there was evidence of effective routines and habits (e.g. one participant claimed to always edit his photos as soon as he returned from holiday), collections had largely come into being through the accumulation of ad hoc photography practices. Taking photographs could simply be a way of engaging with an experience (Sarvas and Frohlich, 2011) and not all photographs were taken with the intention to create a cue for future remembering, as illustrated by Robert, who valued aesthetics over the supporting of memory.

> [Researcher]: Do you have any intention [that they will prompt your memory] when you're taking photographs?
>
> Robert: No, I don't, actually, that's a kind of by-product of what I'm doing. Most of my photography is — to try and take some pictures which both, in a sense, record it, but also are aesthetically-pleasing and attractive.

While the content of participants' photograph collections was not arbitrary, nor was it the product of a coherent remembering strategy. The reasons for taking photographs were multiple and overlapping: memorial, communicative and creative pictures could be taken in competing pursuits of "truth", aesthetic value and personal meaning. In any case, photograph collections did not need to be organised or coherent to effectively support remembering. In fact, archives that were somewhat chaotic could encourage the excitement of serendipitous rediscovery.

Phenomenology and belief in distributed remembering

While distributed cognition has informed recent developments in our understanding of contextualised, socially- and materially-supported remembering (e.g. Clowes, 2013; Dahlbäck et al., 2013; Sutton et al., 2010), it has tended to focus on the components, functions and outputs of distributed systems, and our understanding of *what it is like* to remember in distributed ways, through everyday practices, remains limited. This is not to imply that phenomenology is distributed, but that it is critical to distributed remembering. The phenomenology of individuals engaging in distributed remembering motivates future practices. It also underpins nuanced source and reality monitoring (Johnson and Raye, 1981) and the intuitive understanding of whether photos represent our own past or that of others. For my participants, inference involved a sense of probability, rather than certainty, about what had happened. Associations reconciled event-specific details with personally-meaningful and, often, emotive ideas. Many narratives featured expressions of emotional and sensory memory consonant with the notion of "mental time travel" (Michaelian 2016; Suddendorf and Corballis, 2007).

Beliefs about photography, memory and experience also contributed to how attention was paid to events. Some participants claimed that taking photographs interrupted experience, while others positioned photography as a legitimate part *of* experience. Lorraine, for example, claimed that a camera "gets in the way of experiencing stuff," whereas Robert saw taking photos as part of acting and seeing.

> Robert: Often the experience and the photograph kind of merge, it's not as if they are distinct things. The fact that I take a photograph, actually it's part of the experience.

Ingrid believed that the expense and limited capacity of analogue film made her more careful about what she photographed, and that this increased the value not only of the resulting photographs but also of the practices. Effortful photography was, according to Ingrid, more conducive to remembering because it required greater attention to both the scene and the experience of taking the photograph.

> [Researcher]: So how does taking a photo help you remember a moment?
>
> Ingrid: That is a lot easier with the analogue camera for me, I think, because you actually have to work for the picture, because you have to wind the film and then, you know, kind of — you have to focus and then… wind the film again… I like it. It takes time so you have to take the time, if that makes any sense. It's very, very hard to take a picture just walking by something.

We cannot know whether analogue photography actually was more beneficial to remembering for Ingrid than digital, or under what circumstances. For her, it seemed to produce a different way of paying attention to a scene, and a different valuing of photographs. Nonetheless, we should be wary of general claims about the superiority for remembering of analogue photography (e.g. because it leads to more focused attention or a greater valuing of images) or of digital photography (e.g. because it opens up powerful opportunities for individual and shared engagement with images). While different functions and limitations of technology were important, they were not inherently positive or negative. Beliefs, emotions, personal associations and circumstances shaped interactions, produced different experiences, and motivated future practices.

A framework of Blended Memory

In this section, I develop a framework of blended memory that draws primarily on Sutton's (2010) complementarity view of distributed cognition, in which photography does not stand in for biological processes but is recruited in ways that complement what is already present within the distributed remembering system. However, blended memory differs from most conceptions of distributed cognition (including Sutton's) by focusing on everyday practices – both social and material – and how these are experienced, how they are located within long-term trajectories of activity, and how distributed processes are reconciled with established categories of memory from cognitive psychology. The kinds of memory represented by these categories are, in turn, treated as useful abstract concepts that operate interdependently in everyday remembering, connected together through material and social interactions. The application of this framework to a detailed consideration of everyday photography practices represents an attempt to move beyond the relatively simplistic examples of social and material interaction that are common in distributed cognition research (Loader, 2013).

Key claims:

- Memory manifests as distributed remembering activity.

- Remembering activity involves the integration of different kinds of memory in combination with media practices.
- Remembering activity is both spatially and temporally distributed.
- Remembering can be partially structured through media practices.

Key implications:

- Past remembering activity and media practices have significant implications for current and future activity.
- Results of memory experiments are situated in historical, cultural and environmental contexts.
- Controlled experiments should be complemented by ecologically-valid studies, observation of actual practices, and other methods.

Memory as distributed remembering activity

Despite a large body of research, there remains debate about whether the episodic and semantic systems should be considered physically distinct entities or theoretical systems that explain qualitative differences in the experience of remembering (Glenberg, 1997; Szpunar et al., 2014; Tulving, 1985). As Tulving (2002: 323) put it, "yes, we can talk about memory systems and memory processes … but we have little idea how 'real' these systems and processes are". In other words, perhaps "memory" is just a convenient label for activity that emerges as a coincidence of cognitive processes at the point of remembering.

Conceptions of memory systems as biological have not adequately captured interactions with technology and media because remembering is assumed to be internal (i.e. to happen entirely within the head). It is possible to think of remembering, not as occurring within biological or external elements (Michaelian, 2012; Sutton, 2010), but as constituted by interactions between them. Sutton (2006), for example, argued that the distribution of episodic recall can be seen in Tulving's (1983) influential notion of *synergistic ecphory*, in which cued recall is contingent on the interaction between encoded information (memory traces) and retrieval information (cues). Thinking of remembering as distributed activity, in which different cognitive processes are recruited according to the situation (Sutton, 2010), helps to avoid the temptations and challenges of conceiving of memory as a reified "thing" that we carry around inside our heads with static characteristics and continuity of form.

Memory systems are also commonly represented as independent, as if memory is episodic *or* semantic *or* procedural *or* prospective (e.g. Tulving and Schacter, 1992). Whether or not they *can* operate independently, the claim here is that, in the main, remembering with photography facilitates the interoperation of multiple kinds of memory. It will not be surprising, even to those who study elements of memory in isolation, that a combination of different kinds of remembering is required for many situations (Michaelian, 2012). However, I argue that different aspects of memory do more than collaborate: they support and sustain each other to produce a larger coalescence of remembering that is experienced holistically. An important claim of the blended memory framework is that the interplay between kinds of memory can be, to some extent at least, realised via spatially and temporally distributed media practices. For

my participants, authentic remembering was perceived not just according to conventional parameters such as subjective re-experience or fluency (Jacoby et al., 1989), but also in relation to associations with other events and ideas that located remembrances in a wider context. A *fuller* memory was a more authentic one, even where inference or generative content was evident in its construction, or where photography was seen as essential to the success of remembering. Indeed, interactions with photography were, themselves, experiences (including experiences *of* remembering) that could be remembered.

Blended memory explicitly considers remembering beyond discrete moments, as distributed over long periods of time with the history of material and social interactions contributing to how remembering is done in the present. Just as photography involves capturing, viewing organising and sharing, memory involves prospectively and retrospectively selecting, structuring and constructing resources (such as photos and albums), and practising ways of engaging with them. Within this, phenomenology of remembering and historical engagement with photography are both likely to shape future remembering, not only in motivating the development of photographic practices, but also by shaping processes of remembering (Loader, 2013).

Methodological implications

While classifications such as episodic and semantic memory have been crucial to the abstraction and generalisation of memory processes (Tulving, 1972), considering the integration of different kinds of memory allows for more diverse, realistic, complex and long-term conceptions of how memory works in everyday settings. Yet, blended memory need not disrupt established psychological categories, since the focus is not directly on memory but on *remembering*. Thinking of remembering as distributed activity can enhance our understanding of important psychological theories. For example, it allows us to see that positioning particular categories as discrete and as more or less legitimate forms of memory can obscure the ways in which they structure and support each other. Indeed, it would be interesting to consider how categories of autobiographical memory discussed here (episodic, semantic, inferential) might interact with other kinds of memory. Two possibilities include exploring how configuring future remembering relates to prospective memory, and how practising ways of distributed remembering relates to procedural memory. Blended memory values the phenomenological qualities of memory established through psychological research, but also frames them in relation to the motivation of future practices. This framing might challenge scholars of distributed cognition to take a long-term view of the roles of beliefs and motivations: in looking beyond the immediate output of distributed systems, the experience of remembering becomes important to learning distributed practices, and to choosing which people, materials and practices to engage with in future remembering.

The framework also provides a critical lens through which to consider the parameters and implications of memory research. For example, Henkel's (2014) findings that taking photographs of objects in a museum impaired recall for visual details of those objects should be treated cautiously, since social and material environments, idiosyncratic and historical practices, customisations of technology, beliefs, and ways of making retrospective sense of available cues, are all important elements of remembering. Controlling participants' engagement with photography allows researchers to generalise

about effects, but these effects may be particular to the isolated, short-term and controlled situations in which they are observed. For example, by determining the cameras used, what could be photographed, and the timing of remembering; and by preventing participants from looking at or talking about their images, Henkel placed significant limitations on their possibilities for engaging with technology, other people and, ultimately, their photographs. Indeed, Henkel acknowledged that different effects might be produced by allowing participants to look at their photos.

The study of capturing, organising, sharing and viewing practices will be necessary to build a more complex understanding of engagement with photography. As such, Henkel's (2014) study of the effects of taking photos is a productive step forward. However, like studies of cued recall, Henkel's study focused on a single practice in isolation. Interpreting such results is challenging, since each practice is located within a historical trajectory of related practices (e.g. we often look at photos that we have taken, organised and shared in particular ways, and those prior practices influence how we interpret the image). In blended memory, remembering is not so much *changed* by particular conditions but *produced* in relation to them. The involvement of interweaving practices means that even as one aspect of remembering is reduced, others may come in to compensate. Henkel's effects, for example, might be compensated for by organising, sharing or viewing photographs, or talking with people. Studying the relationship between practices over time, in ecologically-valid situations, is necessary to take into account how people negotiate remembering "in the wild" (Michaelian, 2012: 1163).

Sutton (2010) argued that crossing methods and traditions can open up new avenues of thought, and results from one method can be used to inform studies that use another. Henkel's results, for example, raise interesting questions that can inform explorations of how capturing practices play out in everyday settings, and what the real world implications are for remembering. Conversely, the work of Wang (2013), Pickering and Keightley (2015), Van House et al. (2005) and others has demonstrated the potential of ethnography and interviews to contribute to psychological understandings of memory by capturing everyday practices over long periods of time, and investigating how they might reframe, reinforce, mitigate or contrast with the sorts of phenomena picked up in experimental studies. Understanding blended memory will require the investigation of a large range of scenarios and practices in ecologically-valid settings, over longer timeframes, meaning that experiments will need to be augmented by naturalistic observation, interviews, and other methods.

The blended memory framework also highlights opportunities for future work. If the distributed activity of remembering can be structured and practised, this opens up many avenues for memory research. For example, Harris et al. (2014) proposed that some aspects of neural decline in dementia might be masked by distributed processes of remembering. This indicates both that cognitive capacity—even in cases of impairment—might be enhanced through distributed activity, and, at the same time, that identifying the need for medical or psychological intervention could be delayed without measures that take external memory support into account. Meanwhile, the importance of the phenomenology of remembering means we should be cautious in how we configure memory through distributed practices. In any case, the extent to which people can control

how they remember is questionable, given the complexity of the factors that influence situated activity. All of these issues reflect productive avenues for memory studies.

Conclusion: blending systems and resources in remembering

Psychological studies of cued recall have neglected important aspects of the relationship between photography and memory. Photography not only influences what is recalled when looking at pictures but is part of both remembered experiences and of experiences of remembering. Memory weaves its way through photographic acts of capturing, organising, viewing and sharing, and engaging in these practices contributes to how people distribute their remembering over time. Therefore, factors that affect experience (e.g. beliefs about memory or technology) may be as important as contextual factors that more directly affect behaviour (e.g. technology, culture or environment).

Composing and taking photographs, alongside organising and sharing, are part of prospective configurations of what one remembers and how one will be remembered. This is combined with retrospective practices that make use of cues that have previously been put in place. However, these prospective and retrospective practices are not always intentional, systematic or clearly aligned. My participants found it difficult to engage in consistent patterns of activity due to spontaneous, unplanned actions; incompatible or unclear goals and motivations; beliefs about technology; or the influence of contextual factors. Nonetheless, such inconsistency could lead to highly rewarding, unexpected engagement with photographs.

I have argued that different kinds of remembering, such as those reflected in established categories of episodic, semantic or inferential memory, are interdependent, blending together through interaction with material and social resources. I have also argued that understanding distributed remembering involves more than simply understanding how components of a distributed system work together. While cognitive psychology has often understated the relationship between material and social resources and remembering, distributed cognition has often neglected the importance of phenomenological aspects of memory in relation to everyday practices. Feelings, emotions and beliefs are important, not only for what practices do or do not take place, but what kinds of connections are made with the past. The framework of blended memory, introduced here, aims to highlight the fundamental roles played by both distributed activity and the experience of that activity, not as separate elements but as interdependent, intertwining, constituent parts of a wider remembering system. Some important methodological implications of this view have been discussed, including a need to consider the ways in which different kinds of remembering work together, the value of taking a long-term perspective of remembering activity, and possibilities for exploring people's capacity to structure and practise autobiographical remembering in everyday settings.

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Notes

1 There are notable exceptions to these criticisms, particularly within developmental psychology. See, for example, Fivush and Haden (2003) or Wang (2013).
2 Bernecker (2010) gave us an exception to this trend of de-legitimising inference as a form of remembering by highlighting the prominence of "inferential memory" or "memory based on inferential reasoning" (p. 25). Yet despite claiming that most memories are inferential, he ruled this kind of memory out of consideration for the majority of his book, and thus continued the pattern of neglecting the close empirical study of inference as a legitimate aspect of autobiographical remembering.
3 Though see Pillemer et al. (2015) for a definition of "vicarious memory"; Barnier and Sutton (2008: 179) on the incorporation into memory of information "not originally encoded"; and Brookfield et al. (2008) on vicarious memory in adoptive families.

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